



Original Article

Efficacy of Progressive Resistance Tube Training in Community Dwelling Older Adults: A Pilot Study

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SUMMARY

Background/objective: Falls are known to be one of the most prevalent public health problems in older adults. Currently, the aging population is growing fast. It is essential to use low cost, time-efficient exercise intervention programs for increasing strength, functional mobility, and balance in older adults, and subsequently decrease the risk of falls. This is a pilot study to assess the effects of a 12-week progressive resistance tube training session on the lower limb muscle strength, dynamic balance, and functional mobility in elderly people.

Methods: Seventeen community dwelling older adults with a mean age of 69.2 ± 4.62 years were recruited among residents of a senior day care center in Malaysia to participate in this pilot study. Eight out of 17 participants completed their lower extremity resistance tube training sessions three times per week for 12 weeks. Lower limb muscle strength and functional mobility were tested by five times sit to stand test (FRSTST), and timed up and go test (TUG), respectively. Functional reach test (FRT) and four square step test (FSST) were applied to measure dynamic balance.

Results: The results revealed significant increases in lower limb strength (30.3%), dynamic balance (29.6% in FRT and 15.3% in FSST), and functional mobility (27.1%) (all significant at $p < 0.05$).

Conclusion: It was concluded that the use of a simple and inexpensive strength training program may improve leg muscle strength and consequently dynamic balance and mobility in elderly people and make them independent in their daily activities.

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1. Introduction

Falls are common and potentially fatal events causing functional, psychological, and also social problems in elderly people^{1,2}. Annually, nearly 30% of people over the age of 65 years have experienced a fall³, in which one out of three are hospitalized as a result of fall related injuries⁴. The injuries vary from slight bruising to fracture, coma, and even death⁵ and lead to less independence⁶. Impairments in balance, gait, and lower limb strength are important factors that increase fall rates and inactivity⁷ which might impact on the quality of life for elderly people⁸.

Muscle strength reduces nearly 15% after the age of 50 years and by twofolds after the age 70 years per every decade⁹. It is believed

that both muscle mass atrophy and muscle fiber reduction are effective factors in this process. Fortunately, it is potentially preventable and reversible with proper nutritional interventions and exercise involvement¹⁰. Strength training has been shown to prevent and improve the reduction of muscle strength, mass, and functional capacity^{11,12} and falls in older adults^{13,14}. In spite of these benefits, there are only a few safe and efficient progressive resistance training programs accessible and affordable for older adults¹⁵. Most resistance training is performed in a clinical laboratory using weight machines¹⁴. However, elderly people have difficulties in traveling to sport locations, and therefore do not achieve enough exercise¹³. To impart the benefits of resistance training exercise, development of inexpensive and practical alternative instruments are required¹⁶.

Elastic bands or tubes are easily available, inexpensive, and easy to carry, and older adults can use this equipment to perform and maintain the exercise programs long-term almost everywhere^{13,17}. Hence, the objectives of this study were to assess the effects of a cost effective and accessible resistance training program on lower extremity muscle strength, balance, and functional mobility in

Conflicts of interest: All contributing authors declare that they have no conflicts of interest.

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